MS50.O01

Capturing structural dynamics of materials by picosecond X-ray pulses

S. Adachi[1], T. Sato[1], S. Nozawa[1]
[1]*Photon Factory, KEK, Tsukuba, Japan*

Picosecond time-resolved X-ray techniques, such as time-resolved X-ray diffraction, scattering, and spectroscopy, utilize the pulsed nature of synchrotron radiation from storage rings, and are becoming general and powerful tools to explore structural dynamics in various materials. This method enables to produce “atomic structural movies” at picosecond temporal resolution. It will be fascinating to apply such capability to capture ultrafast structural dynamics in advanced materials of strongly-correlated electron systems, photochemical catalytic reaction dynamics in liquid or on solid surface, light-induced response of photosensitive proteins, etc. Photon Factory Advanced Ring (PF-AR) at the High Energy Accelerator Research Organization (KEK), Tsukuba, Japan is a 6.5-GeV electron storage ring dedicated for single-bunch operation and is suitable for the picosecond time-resolved X-ray studies. An in-vacuum undulator beamline NW14A at the PF-AR was designed and constructed to conduct a wide variety of time-resolved X-ray measurements, such as time-resolved X-ray diffraction, scattering and spectroscopy [1]. Successful examples of time-resolved X-ray studies applied to materials science will be presented in the talk.

[1] *S. Nozawa, S. Adachi, J. Takahashi, R. Tazaki, L. Guérin, M., Daimon, A. Tomita, T. Sato, M. Chollet, E. Collet, H. Cailleau,, S. Yamamoto, K. Tsuchiya, T. Shioya, H. Sasaki, T. Mori, K. Ichiyanagi, H. Sawa, H. Kawata and S. Koshihara, J. Synchrotron Rad.*

Keywords: Pump-probe, time-resolved, synchrotron radiation